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ABSTRACT

A pool of items used for student ratings of college instructors was studied by means of two factor analyses. Major objectives were to confirm the existence of the major dimensions of student ratings as identified in previous research literature, and to determine whether categories or levels of item specificity could be identified. As to the first intent, the dimensions found in the factor analysis of the Form A questionnaire (Course Management, Communication Effectiveness, Outcomes, Difficulty/Workload, Warmth, Encouragement/Stimulation and Assignments) coincided quite well with previously identified dimensions. These results were substantially confirmed with the analysis of Form B using a Likert scale. The most significant unintended outcome from the study was the results of the hierarchical factor analysis. It was a fairly widely held belief that student ratings are subject to one general factor, but the discovery of two general factors from the hierarchical analysis led us to question this assumption. Regarding the attempt to identify levels of specificity, results of the hierarchical analysis permitted empirical classification of items into at least five categories. Logical analysis of these classifications indicated that they are related to item specificity. (Author/CTM)

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Validation of an Item Classification Scheme for a Student Rating Item Catalog[1]

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Introduction

With the introduction of Purdue University's CAFETERIA System (Derry, et al., Note 2) of student ratings for college instructors in 1974, the traditional conceptualization of having a single omnibus questionnaire for a given institution seems outmoded. One of the major reasons for the acceptance and growth of CAFETERIA-like systems (Brandenburg, Note 1; Doyle, Note 3; and Whitney, Note 11) is that they allow faculty to select their own evaluative questions and thus tailor evaluation to individual needs. Omnibus rating forms, like the Illinois Course Evaluation Questionnaire (CEQ), contain items that can be used in a large variety of class settings, so most items are written using general terminology. A CAFETERIA-type system can permit more diagnostic evaluation by including items using more specific terminology.

For the most part, careful conceptual planning has gone into the development of items for omnibus forms. Thus, it seems logical that sound conceptualization should also go into the development of item catalogs, the pool of items which forms the heart of any CAFETERIA-like system. Questions concerning item appropriateness, content coverage (or scope) or how well items are written, also remain important considerations. The major intent of this paper is to describe the process used to develop and investigate the items included in the catalog which will eventually become part of the University of Illinois' Instructor and Course Evaluation System (ICES).

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A General Conceptualization of the Catalog

The developers of the ICES catalog planned that it would differ in two major respects from currently available catalogs (Derry, et al., Note 2; Doyle, Note 3; Kulik, Note 5; and Whitney, Note 11). One difference was that a two dimensional classification scheme for the items was proposed. The two dimensions were item content (construct) and item specificity. The idea for item content classification was derived mainly from previous factor analytic studies of student ratings. The idea that items could be classified by specificity was derived primarily from the work of Smock and Crooks (1973) and Rosenshine (1970). A second difference was that item stems (with three exceptions) were written with a matching five-point bipolar adjective response scale: Was the instructor a good speaker? (Yes, very good -- No, rather poor). It was hypothesized that this response scheme would enhance interpretability of results regardless of whether or not normative information was supplied.

Purposes of the Study

The intent of this study was to provide empirical justification for the scheme used in classifying ICES catalog items. The methodology, hierarchical factor analysis, was used to help define content categories and to attempt a determination of the relative specificity of representative catalog items. Since the varied bipolar adjective response format is not as commonly used as the Likert (Strongly Agree to Strongly Disagree) scale, the authors also attempted to show that the structure of the ICES catalog could be applied to catalogs with different item wordings and Likert response formats.

Review Related to Item Specificity

A preliminary ICES catalog was developed prior to this study. Three categories of item specificity were differentiated and were named[2] Global, General Concept and Specific. These categories were derived from the work of Rosenshine (1970) and Smock and Crooks (1973). Rosenshine defined "high inference" and "low inference" measures from a general definition of inference as "the process intervening between the objective data seen or heard and the judgment concerning a higher order construct of cognitive or social interaction" (1970, p. 500). More specifically, "high inference measures (in this case, items) are those which require considerable inferring from what is seen or heard in the classroom to the labeling of the behavior..." (1970, p. 500). On the other hand "low inference measures (items) are those which require the observer to classify teaching behavior according to relatively objective categories" (1970, p. 500).

The three categories of ICES items may also be related to the purposes of evaluation. Along this line Smock and Crooks (1973) have differentiated three levels (I, II and III) of evaluative information (items here). The first of these, Level I would involve "general, summative evaluation (items), which will be concise and allow broad, general comparisons to be made across departments, but will give little or no specific information to guide instructional improvement" (1973, p. 578). Level II evaluation is "aimed at identifying success or failure in general areas or attributes of instruction" (1973, p. 578) using items which are directed toward "specific attributes and aspects of teaching" (1973, p. 579). Finally, Level III evaluation "is detailed, course specific evaluation aimed at providing diagnostic information

[2] These distinctions and labels were arrived at during a meeting in September, 1976 among Richard Smock, Barak Rosenshine and the current authors of this paper.

about instructional problems" (1973, p. 578) probably in those areas suggested by Level II evaluation. Level III information would be most likely collected through interviews or open-ended questions so that it is detailed and diagnostic.

Our initial ICES categorization of Global, General Concept and Specific items was based on the preceding discussion. Although neither Rosenshine nor Smock and Crooks made the statement, it is intuitively obvious that high inference-low inference and Levels I, II and III are continua, arbitrarily divided. Our conceptualization of item inference, levels or specificity for ICES was essentially that high inference, Level I and Global items are virtually identical. General Concept items are closest to Smock's Level II, and Specific items essentially meet Rosenshine's low inference item criteria. Level III items may be too specific for inclusion in an item catalog although they are potentially valuable for diagnostic purposes. This conceptualization of ICES items is displayed in Figure 1, which summarizes the preceeding discussion.

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Insert Figure 1 about here
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While a number of authors have differentiated very general or global items from those that could be considered less general or more specific (J. Derry, 1977; Doyle and Whitely, 1974, Thorndike, Note 10; and Thorndike and Waldram, 1975), none have considered the trichotomy advocated here. Three studies (Cushman and Tom, 1976; Pohlmann, 1975; and Rosenshine and Stevens, Note 7) have attempted to relate specific items to global items or general teaching objectives. It is significant to note that in Pohlmann's (1975) study he attempts to relate results to Rosenshine's (1970) low inference item designation, but his items do not satisfy Rosenshine's definition. For

example, the item "The instructor was prepared for class" from Pohlmann does not permit the student to objectively categorize a teaching behavior. In terms of our trichotomy, this item is in the general concept category as are at least 80% of the 20 items in Pohlmann's study. To reiterate, the goal of specific items is to provide the instructor with information about specific behaviors that could result in overall teaching improvement. If the item does not relate to a specific teaching behavior, then the instructor is somewhat at a loss to infer what behavior would result in improvement. Only more specific manifestations of being "prepared for class" would satisfy the low inference criterion. In summary, Pohlmann's[3] results did not appear to address the key results.

Cushman and Tom (1976), on the other hand, did identify 28 specific (low inference) teaching behaviors and correlated them with student achievement on seven general objectives each rated by students. The result of their study was a single diagnostic rating instrument containing the 28 items and objectives. One may question the relevance of applying 28 items across a wide variety of teachers and situations. However, the items appear to have sufficient diagnostic value to be included in a catalog of the ICFS type.

Rosenshine and Stevens' (Note 7) approach was to relate low inference items to general ratings of factors previously identified in the literature (e.g., warmth, enthusiasm, clarity, discussion, organization, etc.). Their preliminary study yielded a number of items that relate to these "general concept" categories and the exclusion of a number of others. The goal of their study was to identify specific behaviors that relate to more general judgments and those that do not. This line of research has some apparently

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[3] It may also be noted that if Pohlmann used the citation in his article of Rosenshine's work, then it becomes more understandable why his results do not relate to low inference items. The article he cited makes no mention of the low inference idea.

worthwhile long-range payoffs, but it is also apparent that it is in its infancy.

Two aspects of item specificity were explored in our study. Since this is the first known study utilizing factor analysis to identify specific items, we generated a priori hypotheses regarding statistical behavior of such items. These hypotheses resulted in the original ICES classification scheme. After factor analysis, we were able to study the relationships of specific items to general concept and global items, by observing how they loaded on first order and second order factors.

Review of Factor Analytic Studies

The purpose of most factor analytic studies of student ratings has been to observe their overall dimensionality. Over the past thirty years, most factors have repeatedly appeared in subsequent studies. Generally the factors noted in Isaacson, et al., (1964) have been replicated (with different names, of course) in most studies. A major exception to this trend was that given in Hartley and Hogan (1972) with their conceptualization of student outcome related items.[4]

Our study did not have as its intent the discovery of new dimensions. Instead, our purpose, validating an item catalog, was to demonstrate that the major and consistent factors found in previous studies were duplicated here. Thus, one primary objective in catalog formation was comprehensiveness of sampling from areas of factor space. The review of factor-analytic and other studies relating to factor analysis presented in this section was also undertaken to obtain knowledge of the methodological procedures utilized.

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[4]This is true in the sense that they labelled factors as "outcomes." However, some earlier studies (Holmes, 1971; Aleamoni and Spencer, 1971) contained similar items. They only neglected the label.

Following a model provided in Kulik and Kulik (1964) for observing the similarity among observed factors, Table 1 contains the classification of factors identified in previous studies. While Kulik and Kulik (1964) used the first four major categories (Skill, Rapport, Structure and Difficulty) it appeared useful to add a fifth, Outcomes, in view of Hartley and Hogans' (1972) results and those in subsequent (e.g., Doyle, 1977 and Frey, et al., 1975) studies. Obviously, the names of the factors differ from study to study, but the overriding impression gained from Table 1 is that the five major categories of factors are consistent. This stability is rather dramatic when one imagines the different sets of items, student populations, sample sizes, factoring procedures, rotation procedures and other aspects of these studies that have gone into producing the results.

It seems fair to conclude on the basis of this review that Instructor Skill, Student Rapport, Teaching Structure, Course Difficulty and Student Outcomes would be the five major dimensions included in an item catalog. The other factors appear to be minor. For an item catalog to be complete or comprehensive, minor factors would also be included, but major factors were our primary concern.

A second aspect of this review was to examine some of the methodological components of these studies, especially the specificity of the items, item scaling and rotation procedures. Specificity of items refers to the trichotomy of items advocated within ICES as discussed earlier. Scaling was reviewed because many ICES items were to be bipolar adjective end-points on a five point continuum, and this scaling had not been widely used. Rotation procedures were examined because of the authors' hypothesis that certain factors generally appear to be at least moderately correlated. A strong case can be made that factors are correlated and, therefore, using orthogonal

rotations would be denying the obvious.

In most studies the items in the questionnaire could be classified as either global or general concept. The exceptions to this were some specific items in Gibb (1955), Barnoski and Sockloff (1976), Hildebrand, et al., (1971), Umble and Whitten (1977), Greenwood et al., (1974) and Solomon (1966). Most items in Doyle and Whitely (1974) and Deshpande, et al., (1970) could be classified as specific. While the population of specific items is potentially infinite, it does not appear that they have been widely used in factor analytic studies.

Item scaling has varied a great deal across studies with the most popular being the 5-point frequency of occurance scale. These scalings include the Likert (Strongly Agree to Strongly Disagree), excellent-poor, definitely yes-definitely no, much like the instructor to much unlike the instructor and a few variations of the latter. Six studies utilized 7-point scales (Doyle, 1977; Umble and Whitten, 1977; Frey, 1977; Doyle and Whitely, 1974; Frey, et al., 1975; and Greenwood et al, 1974). Others used a 5-point scale consistency except Linn, Centra and Tucker (1975) and Holmes (1971). Thus a 5-point response scheme seems most popular.

In terms of factor rotation procedures one is given the impression that varimax has no equal. One study used an alternate orthogonal approach--promax (Linn, Centra,and Tucker, 1975). Only one utilized oblique rotation (Gibb, 1955).

Method

Questionnaire Construction

A preliminary version of the ICES Item Catalog containing 450 items was culled from a list of approximately 1800 items used on other campuses and from items generated by the authors. The items were classified by two

dimensions: content categories (identified on the basis of previous factor analytic studies) and item specificity (Global, General Concept and Specific as defined earlier). The preliminary catalog contained 14 content categories, 11 of which were utilized in the present study. These eleven had been identified as representative of content areas found in many previous factor analytic studies.

Two questionnaires, Form A and Form B, were composed and each contained three common Global items: "Rate the course content," "Rate the instructor" and "Rate the course in general" to be answered on a six-point "excellent" to "very poor" response scale. Form A was compiled by the first author to include 95 additional General Concept and Specific items drawn from the preliminary catalog. Specific items outnumbered General Concept items approximately 2 to 1 for each content category. Item selection was not random, but designed to be representative. Response scales consisted of bipolar adjective endpoints only on a five position continuum.

Form B was constructed independently by the second author. No attempt was made for item parallelism with Form A, although the major eleven ICES categories served as guidelines. Approximately the same proportion of Specific to General Concept items were written and the complete questionnaire consisted of 94 additional items. The response scale for Form B was a Likert (Strongly Agree to Strongly Disagree) five point continuum in which intermediate responses were labelled.

This developmental procedure evolved from the notion that independent questionnaires, each representing controlled sampling from the same factor space, should be equivalent evaluative measures despite differences in scaling procedures and item wording. Thus items from Form B might be used to "confirm" the Form A factor structure, as data representing the two

instruments could be collected at the same time, under the same conditions, and from the same student population.

Sample

Questionnaire Forms A and B were administered by the authors in 38 class sections in 20 different courses in a variety of academic departments (Anthropology, Architecture, Business Administration, History, Home Economics, Microbiology, Philosophy and Political Science) at UIUC in the last two weeks of instruction of the spring semester, 1977. All classes contained almost exclusively undergraduate students and fairly equal proportions of freshmen, sophomores, juniors and seniors responded. In class sections of less than 25 students only one (randomly chosen) form was administered; class sections of more than 25 students were given both questionnaires, each student completed one form handed out in cyclic order. In this manner, 12 class sections completed Form A only, 11 completed Form B only and 15 completed both A and B. Usuable responses were obtained from 766 students on Form A and 816 students on Form B. A criterion of 90% completion of items and a hand check for unpatterned responses was used to identify usuable questionnaire results.

Analyses

An exploratory factor analyses was performed on the data from Form A. Based on the Scree Test, a seven factor solution was chosen. The initial factor solution was obtained from the matrix of interitem correlations with squared multiple correlations replacing the diagonal elements. The extraction program was Simple Common Factor analysis, part of the SOUPAC statistical package (Computing Services Office, Note 9). This solution was rotated to a binormamin criteria which produced an oblique solution. Graphical rotations were also made in an attempt to improve the binormamin rotation.

The intercorrelations among the oblique Form A factors were used in a

second-order solution. Identical procedures used to extract and rotate the first-order solutions were employed in the second-order factor analysis. Two higher-order factors were extracted, based upon the results of the Scree Test. The resulting second-order solution supplied a logical interpretation and was thus adopted.

A confirmatory analysis was then conducted with items selected from Form B. Eighty-seven items were chosen to test the hypothesis that the structure derived from the factoring of Form A would account for the interrelationships among the eighty-seven item questionnaire. A seven factor solution was extracted from the questionaire data, again using simple common factor analysis with binormamin rotation. The goodness of fit was evaluated by observing the discrepancies between the original eighty-seven item intercorrelation matrix and the reproduced matrix obtained from the factor solution.

Two higher-order factors were extracted from the first-order factor intercorrelation matrix of Form B using procedures described above. Again, the goodness of fit was evaluated by comparing the Form B factor intercorrelations to those of the reproduced matrix obtained from the second-order solution.

Following "confirmation" of the Form A factor solution, a final hierarchical factor solution was obtained for the Form A data according to the Schmid-Leiman (1957) transformation procedure. This procedure produces a hierarchical orthogonal solution with loadings computed for first- and second-order factors. This solution was used to observe descriptive properties of item specificity on Form A items.

Results

The seven-factor solution of Form A accounted for 37.8% of the total variance. (Fifty-six factors, whose eigenvalues were greater than R-U^2,

accounted for 52.6% of the total variance.) Although an appreciable amount of the variance was left unaccounted for, it should be remembered that replacing the diagonal elements with squared multiple correlations is a lower bound of the communality estimates (Harmon, 1967). The eigenvalues and percent of variance accounted for by each of the seven factors are presented in Table 2.

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Insert Table 2 about here
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In addition to the binormamin rotation, the first and second factors of Form A were graphically rotated to improve the fit and interpretation of the factor structure. Table 3 contains the rotated factor loadings for the 98 items on the seven factors. Of the 98 items, 16 items did not yield at least one loading of .30 or greater.

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Insert Table 3 about here
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Factor I (Course Management/Procedures) was composed of a number of minor factors similar to those observed in the row labeled "Structure" in Table 1. Items with high loadings on this factor were 27, 56, 25, 71, 6, 47, 3, 2, 90, 22, 1 and 17. This factor involved the fairness of the tests and grading procedures, organization and progression of the course, accomplishment of course objectives and overall evaluation of the course, instructor and course content.

It should be noted that the identified global items (1, 2, 3) have significant loadings on Factor I and at least one other factor. Global items, by their nature, may be expected to show such a pattern.

Factor II was labeled Communication Effectiveness. Again, similarities can be drawn from this factor to those in the row labeled "Skill" in Table 1. Basically, Factor II involve the instructor's speaking ability with emphasis

on the instructor's dynamism, knowledge of subject matter, effective use of humor, enjoyment of teaching, seldom speaking in a monotone, and having interesting presentations. Items with high loadings on these factors were 26, 55, 82, 89, 32, 94, 73, 2 and 80.

Factor III (Encouragement/Stimulation) is similar to the factor identified in studies by Doyle (1977), Doyle and Whitely (1974), and Holmes (1971). It is concerned with the instructor's ability to encourage student ideas, raise challenging questions, enhance students' creative abilities, and suggest specific ways students could improve. Items having high loadings on this factor were 62, 53, 29, 43, 31, 58, 34, 77 and 42.

The fourth factor, Cognitive and Affective Outcomes, is comparable to those factors observed in the row labeled "Outcomes" in Table 1. It deals with the students' interest in the course, material learned, and general and specific outcomes. The items loading high on this factor were 50, 74, 13, 65, 10, 39, 15, 66, 18, 76, 1 and 81.

Factor V (Difficulty/Workload) is also a major factor identified in previous research--row labeled "Difficulty" in Table 1. The factor involves the students' perception of the difficulty of the course material, examinations, the pace of the course, and the amount of preparation and effort required for the course. Items which loaded high on this factor were 85, 57, 93, 95, 11, 75, 59, 41 and 98.

Factor VI (Warmth) is similar to those factors found in the row labeled "Rapport" in Table 1. In this factor attention is focused on the instructor's patience, friendliness, lack of cynicism, attention paid to students, and willingness to help students with their problems. The items with high loadings on this factor were 20, 60, 77, 79, 68, 91 and 35.

The last factor (Assignments) is primarily form specific. It involves

the readings and text and whether they were interesting, stimulating, and well selected. Only three items (52, 70 and 49) had loadings of greater than .40.

The second step in the analysis was a hierarchical factor analysis of Form A. The correlations among the seven factors were factored by simple common factor analysis and rotated to an oblique (binormamin) simple structure. Two factors were identified. The first was composed mainly of Factors IV and II and was labeled "Influence." Factors III, V and VII had moderate loadings on this factor. The second higher-order factor was composed mainly of Factors I and VI and was labeled "Security"; Factor V had a moderate negative loading on this second-order factor. (The factor loadings for the hierarchical analysis are presented in Figure 2.) The correlation between the two second-order factors was .178.

Prior to further analysis of the Form A higher-order solution, a similar confirmatory factor analysis was conducted on the total 97 items of Form B. Appendix A provides the loadings of all 97 items rotated to an oblique criterion. An inspection of the loadings indicated a "contamination" of one factor by certain items. Thus, in order to increase the similarity among major factors of the two forms, ten items from Form B were eliminated. No item which appeared to measure unique factors was eliminated.

Correlations among the modified 87 items of Form B were factor analyzed and rotated using the same procedures as described above. The factor structure for the 97 items of Form B was maintained by using the 87 items. Appendix B contains the eigenvalues and percent of common variance accounted for in the first seven factors of the modified version of Form B. An examination of the residual correlation matrix (observed minus reproduced correlation matrix) indicated only 26 elements having values greater than

.10. This would seem to indicate that the factor structure of Form A was replicated.

A comparison of the first-order factor solution for Form A and the selected 87 items of Form B is given in Table 4. Lines are drawn between factor labels showing greatest similarity. Again the five major factors of Table 1 are replicated in both Form A and B. Factor IV' (Warmth/Encouragement) items of Form B are separated into two factors in Form A (III and VI). Factor VII of Form A (Assignments) is unique relative to Form B; Factors V' and VII' (Easiness and Student Preferences for Instruction, respectively) of Form B are unique relative to Form A.

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Insert Table 4 about here
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Further similarities of the factor structures can be observed by examining the intercorrelation factor matrices for the two forms given in Table 5. Note that for the five major factors (those that are comparable to the factors listed in Table 1), the direction and magnitude of the correlations between the forms are very similar. Differences between the correlations ranged from .15 to .01 with one exception, which was .36. This was the difference in the correlations between Class-Course Management and Difficulty/Workload. The median difference among the correlations was .08.

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Insert Table 5 about here
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Intercorrelations of the seven oblique factors of the modified Form B were submitted to second-order factor analysis. This two-factor solution was rotated in order to replicate the solution of Form A. The residual correlation matrix identified only 26 elements whose differences between observed and reproduced correlation were greater than .10. This result lends support for the existence of the two higher order factors found in Form A. Figures 2 and 3

show how the seven factors of Form A and Form B can be represented in two dimensional space with major axes labeled as "Influence" and "Security." The two solutions are remarkable similar even though the factors are somewhat different.

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It should be noted that while "Influence" had a greater eigenvalue than Security in Form A, the reverse was true for Form B. One of the largest differences between the solutions was the location of the general "Rapport" (See Table 1) factor. This factor was strongly related to the Warmth factor (VI) on Form A, while factor IV' (Warmth/Encouragement) of Form B contained items of similar content to Factors VI (Warmth) and III (Encouragement) of Form A. This difference would seem to account for the high loading of the Warmth factor on the Security dimension for Form A, and the double loadings for the similar factor on the Security and Influence dimensions of Form B.

Following this confirmation of the Form A hierarchical factor solution, a final step in the procedure was to apply the Schmid-Leiman transformation to the data. This set of hierarchical orthogonal loadings for each of the 98 items on the two second-order and seven first-order factors is displayed in Table 6.

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Insert Table 6 about here
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The purpose of this analysis was to observe the potential properties of items according to levels of specificity, i.e., Global, General Concept, and Specific items. Our hypothesis was that items with high loadings on both second-order factors, but low loadings on all first-order factors are highly general and extract summary judgments of overall teaching performance.

Conversely, items with high loadings on a first-order factor and relatively lower loadings on both general factors extract more specific judgments related to a particular area of instruction and thus require lower-inference judgments.

The item loadings from Table 6 were classified according to the above general hypotheses and the results are displayed in Table 7. A first step in the preparation of Table 7 was to decide on some arbitrary cutoffs for loadings. A value of .30 was used to indicate significant loadings on either one or both second-order factors, while a value of .25 was used to indicate significance for first-order factors. The latter value was chosen because second-order factors appeared to depress or "ciphen off" first-order loadings observed in Table 6. Thus, .25 was selected to counteract this general occurence.[5]

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Insert Table 7 about here
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The upper portion of Table 7 contains the item numbers where loadings exceeded .30 on both second-order factors. These items may be designated as the most general or global. A division was made between items loading higher on Influence than Security and the opposite. Secondly, a three part differentiation was made among items in which second-order loadings were greater than the first-order loadings, first-order loadings occurring between the second-order loadings and first-order loadings greater than the two second-order loadings. Items for which second-order loadings were higher may be considered the more general. Item numbers are given in rank order of the

[5]This result was not unexpected because adding two factors related to previous first-order factors would have this effect depending on, of course, the extent of item relationships to the second-order factor(s).

highest average second-order loadings. Notice that our previously identified Global items (#1, #2 and #3) all fall in the most general category and also are the only items to yield two significant first-order loadings (each lower than second-order loadings). Items 25 and 81 also came close to satisfying this criterion. All items in the upper portion of Table 7 appear to be relevant to virtually all classes with the possible exceptions of items 65 and 87.

The lower portion of Table 7 was similarly constructed. Two columns of item numbers are given where the second-order loading exceeded the first-order loading labeled as "A > a" for Influence items and "B > a" for Security items. These items were termed "First Level General Concept" (FLGC) items. Two other columns give item numbers where first-order loadings exceeded second-order loadings ("a > A" or "a > B") and these items were termed "Second Level General Concept" (SLGC) items. The last two columns ("a only") on each side of the table contain items where second-order loadings were not significant, and these were placed into the Influence and Security sides of the table depending which second-order loading was higher. These items were labeled as "Specific." Finally, eleven items had no significant first or second-order loadings and were classified as "unique."

A logical analysis of the items classified under the four categories (excluding "unique") does lend some credibility to the hypotheses that these are levels of item specificity. At least there appears to be many differences in specificity when comparing item categories somewhat apart from one another (for example, Global with SLGC or FLGC with Specific). Global, FLGC, SLGC and Specific may be different categories of a continuum, possibly related to item specificity, but it may be quite another matter to state that this is identical to the high inference-low inference continuum.

Conclusions

There were two major intents of the present study which can be stated simply as (a) confirming the existence of the major dimensions of student ratings as identified in previous research literature and (b) attempting to determine if categories or levels of item specificity could be identified. As to the first intent, the dimensions found in the factor analysis of the Form A questionnaire (Course Management, Communication Effectiveness, Outcomes, Difficulty/Workload, Warmth, Encouragement/Stimulation and Assignments) coincided quite well with previously identified dimensions. These results were substantially confirmed with the analysis of Form B using a Likert scale.

The most significant unintended outcome from the study was the results of the hierarchical factor analysis. It is a fairly widely held belief that student ratings are subject to one general factor, but the discovery of two general factors from the hierarchical analysis lead us to question this assumption. This finding is discussed in more depth later.

Regarding the attempt to identify levels of specificity, results of the hierarchical analysis permitted empirical classification of items into at least five categories. Logical analysis of these classifications permits a judgment that they are related to item specificity. Whether or not the empirical classification of specificity bore a close resemblance to a semantic one, and beyond that to the high inference-low inference continuum is a matter for future research. The present results at least provide a framework for hypothesis generation.

It is worthwhile to note here that our logical classification of items in terms of specificity (Global, General Concept and Specific) in the ICES catalog was not wholly substantiated. After an analysis of the results of this study, there appear to be two general reasons for this conclusion. One was that our original logic was faulty, i.e., taking a closer look at ICES items

subsequent to the study, we can agree more with empirical results than our original thoughts. Secondly, even where our logic does not appear faulty one may expect semantic classification and empirical classification to disagree due to the imprecision inherent in both processes. In general, however, we are not disappointed in this conclusion because we have substantially demonstrated the existence of some continuum of item specificity present in this empirical analysis.

A second point on this issue concerns the utility of the specificity continuum regardless whether or not the basis is empirical or logical. We assume that improved instruction is related to increased performance on global item results. We know that global items are related to general concept items because both load on the same second-order factor. Specific items load on the same first-order factor with certain general concept items, but specific items are not directly related to global items because they do not load on second-order factors. If instruction can be improved by changing specific behaviors (determined from results on Specific items), proving cause and effect within this framework would be a challenging endeavor since our results suggest that items measuring specific behaviors are at least two stages away from items measuring global performance. The utility of the item specificity continuum would appear to depend upon empirical demonstration of the linkage of specific item results (behaviors) to more global ones.

Implications

The most generalizable outcome from the present study is the confirmed existence of two general constructs that underlie the questionnaire items utilized in the present study. These global factors--Influence and Security--may provide a general model from which to explore and analyze results from student rating questionnaires.

An example of this type of exploration is given in a recent paper by Frey (Note 4). Frey refactored his seven-item scale (which he originally suggested was seven factors) to two factors which he called Pedagogical Skill and Rapport. He then reexamined data he had previously collected using factor scores from his two-dimensional scheme. He found the Rapport scores were highly related to mean class grade while Skill scores were not. Rapport decreased with increased instructor rank while Skill increased and stabilized. Rapport decreased dramatically with increased class size, but Skill slightly increased. Rapport was virtually unrelated to first author citations of the instructor, while Skill ratings increased with more citations. Finally, the median correlation between classroom achievement (based on Frey's previous work) and Rapport was .29; for Skill it was .81.

The question of bias in ratings leads us to suggest also that there may be more bias associated with items that are somewhat general (requiring) judgments from students) than items of the true low inference variety (requiring descriptions from students). We present no evidence for that hypothesis although the logic presented would indicate that this is likely to be the case. From Frey's work we might also conclude that this bias may interact with one global dimension (Security) more than the other (Influence).

Frey's Skill and Rapport factors are close in nature to the general factors described here--Influence and Security. The difference between our work and his is in the methodology used to provide a more complete description of the relationships between these factors. The conclusion, however, remains that a two-factor model may assist in explaining the continuing controversies about bias and student ratings.

Another implication involves the analysis and evaluation of student rating questionnaires. The general two-dimensional model should assist in

examining potential bias in questionnaire scales, their comprehensiveness and balance. Obviously the same approach can be applied to devising original instruments. In ICES, as well as a few other CAFETERIA-type systems, provision is made for departments to choose a set of items (called a "core") that can be used to provide comparative data in that given academic unit. Our general model could assist in evaluating items considered for inclusion in these departmental "cores."

The general two-dimensional model also appears relevant to some data collected in a previous study conducted by the first author in a project to develop an instructor self-evaluation instrument (Batista & Brandenburg, 1975). In this study it was found that instructors who received higher student ratings generally rated themselves higher on two scales called Enthusiasm for Teaching and Stimulation of Cognitive and Affective Gains (Influence) and lower on Rapport and Classroom Procedures (Security). A conclusion drawn from that study was that instructors rated more highly by students emphasized the constructs in the former two scales and made the assumption that the latter two were consequences of that emphasis. This is another hypothesis, but the present study may provide some useful direction toward examining its validity.

The two-dimensional model may be further related to faculty and course development activities. It is potentially possible to locate in semantic space (through, for example, multidimensional scaling techniques) different types of classes or instructors identified using certain well-selected questionnaire items. The determination of what items is still a problem, but certainly a number of clues have been supplied here. To provide some notion of the potential utility of this approach, suppose we assume that positive ratings on outcomes, communication skills and difficulty dimensions relate to better classroom achievement. Further, assume that a given instructor has high Security ratings and low Influence ratings. What suggestions can we

make to an instructor to improve classroom achievement? If it is possible to identify specific teaching behaviors related to the Influence dimension and positively change instructor performance on those behaviors, then classroom achievement may be improved. While this reasoning may sound like conjecture at this time, the answers to improvement questions such as that just described may depend upon further development or refinement of the two-dimensional model.

We also might apply the Influence-Security model to decipher what combination yields the best learning in different areas of academic study. It is likely that this model is not as discipline-specific as many other approaches are, but that, too, remains a topic for further study.

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Table 1. Studies with Factor Analysis

Factors Identified	Barnoski & Sockloff 1976	Despande, et al. 1970[a]	Doyle 1977	Doyle & Whitely 1974	Frey, et al. 1975	Gibb 1955	Greenwood, et al. 1974	Hartley & Hogar 1972
Skill	Lecture Presentation Effectiveness	Stimulation (Communication)	Expositional Clarity (See Structure)	Expositional Skills	Clarity of Presentation	Communication	Facilitation of Learning Voice Communication	Overall Evaluation
Rapport	Professor-Student Relationship	Affective Merit	Attitude Toward Students	Attitude Toward Students	Personal Attention	Friendly-Democratic	Rapport Openess	Student-Teacher Interactio
Structure		Cognitive Merit	Expositional Clarity (See Skill)		Organization/ Planning	Organization	Obsolescence of Presentation Currency of Knowledge	Structure/ Organizati
Difficulty		Stress			Work Load	Academic Emphasis	Evaluation	Load or Difficulty
Outcomes			Outcome Motivation	Motivation of Interest in Subject Matter	Student Accomplishment			General Cognitive Development Field Specific De Relevance
Other	Text & Readings Examination Effectiveness		Stimulation of Student	Stimulation of Thinking Generalization of Course Content	Class Discussion Grading	Residual	Commitment to Teaching	

[a]These were second-order factors.

Table 1. (continued)

Factors dentified	Hildebrand, et al. 1971	Holmes 1971	Isaacson, et al. 1964	Linn, Centra Tucker 1975	Pohlmann 1972	SIRS MSU, 1971	Solomon 1966	Umble & Whitten 1977
Skill	Dynamism/ Enthusiasm	Instructor Presentation	Skill	Lectures	Clarity of Communication	Instructor Involvement	Energy vs. Lethargy	Professional Competency
Rapport	Instructor-Student Individual Interaction	Instructor-Evaluation	Rapport	Teacher-Student Interaction		Student-Instructor Interaction	Lecturing vs. Participation Warmth vs. Coldness Criticism vs. Tolerance	Receptivity
tructure	Organization/ Clarity	Student Stimulation*	Structure	Course Objectives and Organization	Class Management	Course Organization	Control vs. Permissiveness	
ifficulty			Overload	Course Difficulty and Workload	Difficulty	Course Demands		Potency-Difficulty
Outcome		Student* Stimulation			General Attitude	Student Interest		Motivation
Other	Analytic/ Synthetic Approach Instructor-Group Interaction		Group Interaction Feedback	Exams Readings and Assignments	Dependability Course Overlap Textbook		5 others	Personality Professional Behavior

Table 2

Labels, Eigenvalues and Percent of Variance for Form A Factors

	Factor Label	Eigenvalue	Percent of Common Variance
I	Course Management/Procedures	21.22	56.2
II	Communication Effectiveness	4.59	12.2
III	Encouragement/Stimulation	4.26	11.3
IV	Cognitive and Affective Outcomes	2.88	7.6
V	Difficulty/Workload	1.94	5.1
VI	Warmth	1.66	4.4
VII	Assignments	1.22	3.2
	TOTAL	37.77	100.0

Table 3

Rotated Factor Loadings of Form A Items

	I	II	III	IV	V	VI	VII
1. Rate the Course Content	42	08	-04	46	02	-12	14
2. Rate the Instructor	45	50	05	11	03	-09	-02
3. Rate the Course in General	46	19	02	36	-03	-15	14
4. The instructor's presentations allowed for easy note taking. A = ALMOST ALWAYS ... ALMOST NEVER = E	35	30	-02	03	-06	-05	-01
5. Was the instructor easily frustrated? A = YES, VERY OFTEN...NO, HARDLY EVER = E	-17	-32	02	12	-07	-23	09
6. Did the instructor have a realistic definition of excellent performance? A=YES, VERY REALISTIC..NO, VERY UNREALISTIC=E	47	20	14	-05	-05	03	11
7. Did instructional materials appear to be conscientiously prepared or chosen? A = YES, ALWAYS ... NO, SELDOM = E	29	37	-05	11	09	00	-01
8. The instructor made use of alternative explanations when needed. A = ALMOST ALWAYS ... ALMOST NEVER = E	17	22	34	00	04	24	-07
9. Classroom facilities were: A = VERY POOR ... QUITE ADEQUATE = E	13	-24	-05	11	-01	-10	-14
10. How much do you feel you have accomplished in this course? A = A GREAT DEAL ... VERY LITTLE = E	34	02	05	64	01	-10	07
11. Instructional materials for this course were: A = TOO ELEMENTARY ...TOO ADVANCED = E	-02	04	03	-03	-56	-02	03
12. How demanding was the instructor in terms of the length of the written assignments, due dates, etc? A = OVERLY DEMANDING...VERY REASONABLE = E	-15	08	05	05	06	-31	-13
13. This course helped me to fulfill some of my personal goals. A = TO A GREAT EXTENT ... NOT AT ALL = E	09	-04	14	67	01	01	07
14. The lecture-discussion method used in this class left me bored. A = ALMOST ALWAYS ... ALMOST NEVER = E	-10	-31	02	-20	01	-06	-24
15. Did you improve your ability to communicate clearly about this subject? A = YES, SIGNIFICANTLY...NO, NOT REALLY = E	22	-03	12	38	-06	06	-05

	I	II	III	IV	V	VI	VII
16. I sought help when I didn't understand the material. A = ALWAYS ... NEVER = E	-08	-06	23	13	09	17	01
17. Was class time spent on unimportant and irrelevant material? A = YES, OFTEN ... NO, NEVER = E	-41	-21	14	-15	-17	-03	-11
18. How much factual material did you learn in this course? A = A GREAT DEAL ... VERY LITTLE = E	33	00	-25	53	14	-02	11
19. The instructor generally talked: A = TOO FAST ... TOO SLOW = E	10	17	-11	02	26	-13	-10
20. How patient was the instructor in working with students? A = VERY PATIENT ... RATHER IMPATIENT = E	-01	14	27	-05	03	65	-02
21. Did the instructor present material in class that was not covered in outside readings? A = YES, OFTEN ... NO, SELDOM = E	-18	22	17	09	-08	-10	-13
22. Were exams, papers, reports returned with explanations of errors or personal comments? A = ALMOST ALWAYS ... ALMOST NEVER = E	43	-18	31	-22	11	05	-01
23. Did lectures repeat material covered by the readings? A = YES, TOO OFTEN ... NO, TOO SELDOM = E	10	-22	-11	02	-02	07	18
24. How did the instructor perceive and respond to student difficulties with course material? A = OBLIVIOUS, UNAWARE... AWARE, HELPFUL = E	-29	03	-27	-06	07	-40	-01
25. Do you feel course objectives were accomplished? A = YES, TO A GREAT EXTENT ... NO, NOT AT ALL = E.	56	03	02	37	-01	-02	04
26. Was the instructor a good speaker? A = YES, VERY GOOD...NO, RATHER POOR = E	20	73	00	-06	05	-06	-02
27. How would you rate the instructor's examination questions? A = EXCELLENT ... POOR = E	70	-02	17	-05	-10	-18	09
28. The instructor explained new ideas by relating them to familiar concepts. A = OFTEN ... SELDOM = E	21	27	21	05	-05	13	02
29. Was a good balance of student participation and instructor contribution achieved? A = ALWAYS ... NEVER = E	07	-06	53	01	01	22	12
30. The instructor's knowledge of subject was: A = EXCELLENT ... POOR = E	36	54	-02	04	08	05	-10

	I	II	III	IV	V	VI	VII
31. The instructor clarified student ideas by inflection (i.e., said "Do you mean...). A = ALMOST ALWAYS ... ALMOST NEVER = E	06	-05	48	-03	-01	20	02
32. How interesting were the instructor's presentations? A = VERY INTERESTING...RATHER BORING = E	16	55	-01	16	05	-06	21
33. How would you rate the instructional materials used in this course? A = EXCELLENT ... POOR = E	10	24	-02	30	09	-07	37
34. The instructor could sense when an idea had not been clear to students. A = STRONGLY AGREE...STRONGLY DISAGREE = E	22	04	44	-01	-08	20	07
35. Was the instructor willing to spend extra time with you? A = VERY WILLING ... VERY UNWILLING = E	25	-21	31	00	09	45	-01
36. What contribution did unrequired supplementary text(s) make to learning in this course? A = CONTRIBUTED GREATLY...CONTRIBUTED LITTLE = E	-10	05	17	05	01	-08	27
37. The instructor varied the tempo of the class to suit content and students' needs. A = ALMOST ALWAYS ... ALMOST NEVER = E	13	31	33	-03	-11	02	19
38. In terms of direction and structure of the course, the instructor was: A = FLEXIBLE ... RIGID = E	-02	01	39	-05	-18	12	08
39. Compared to other courses, how much did you learn in the course? A = MUCH MORE ... MUCH LESS = E	34	00	02	63	13	-08	06
40. Of what value were other class members in assisting the learning process? A = HIGH VALUE ... NO VALUE = E	-03	-08	38	20	03	-03	-10
41. Should more/less time be provided to review and synthesize course material? A = MUCH MORE TIME ... MUCH LESS TIME = E	-21	00	-14	03	45	09	-06
42. Did the exams challenge you to do original thinking? A = YES, VERY CHALLENGING ... NO, NOT CHALLENGING = E	21	-09	41	-05	30	01	01
43. My creative abilities were enhanced as a result of this course. A = TO A GREAT EXTENT ... NOT AT ALL = E	08	02	48	32	-02	-02	-02
44. Describe your written assignments. A = INTERESTING, STIMULATING ... DULL, UNINSPIRING = E	17	-06	28	14	04	00	13

	I	II	III	IV	V	VI	VII
45. Describe the clarity of instructor's presentation of abstract ideas, concepts, and theories. A = VERY CLEAR ... VERY UNCLEAR = E	38	26	07	11	-10	05	05
46. How friendly were the students in this class? A = VERY FRIENDLY...RATHER UNFRIENDLY = E	-05	03	26	16	-11	12	01
47. Was there agreement between the announced objectives of the course and what was actually taught? A = STRONG AGREEMENT... NO AGREEMENT = E	47	06	-04	17	02	11	-04
48. I developed a more positive self-concept because of this course. A = TO A GREAT EXTENT...NOT AT ALL = E	23	04	34	41	-08	-10	07
49. Were readings well selected? A = YES, ALL VERY GOOD...NO, ALL VERY POOR = E	12	02	-02	01	01	-03	62
50. Did this course increase your interest in the subject matter? A = YES, GREATLY ... NO, NOT MUCH = E	17	00	04	68	-05	-02	15
51. How often did the instructor digress during the lectures? A = QUITE OFTEN ... ALMOST NEVER = E	-30	-10	25	-07	-10	-10	07
52. Rate the text(s) used in this course. A = EXCELLENT ... POOR = E	-01	00	-08	05	02	-03	79
53. Did the instructor raise challenging questions in class? A = YES, OFTEN ... NO, SELDOM = E	06	10	55	-02	08	00	09
54. Did you actively participate in class discussions? A = YES, OFTEN ... NO, NEVER = E	02	00	32	03	09	-03	09
55. The instructor was a dynamic teacher. A = YES, VERY DYNAMIC...NO, VERY DULL = E	24	70	13	-08	02	-05	06
56. The grading procedures for this course were: A = VERY FAIR ... VERY UNFAIR = E	64	-06	09	-04	-16	00	10
57. The content of the course was: A = TOO ADVANCED...TOO ELEMENTARY = E	10	01	09	-06	63	-01	12
58. Did the instructor suggest specific ways students could improve? A = YES, FREQUENTLY...NO, ALMOST NEVER = E	40	00	46	09	-03	02	-07
59. Compared to other courses, how much effort did you put into this course: A = MUCH MORE ... MUCH LESS = E	-08	01	16	33	47	-02	10

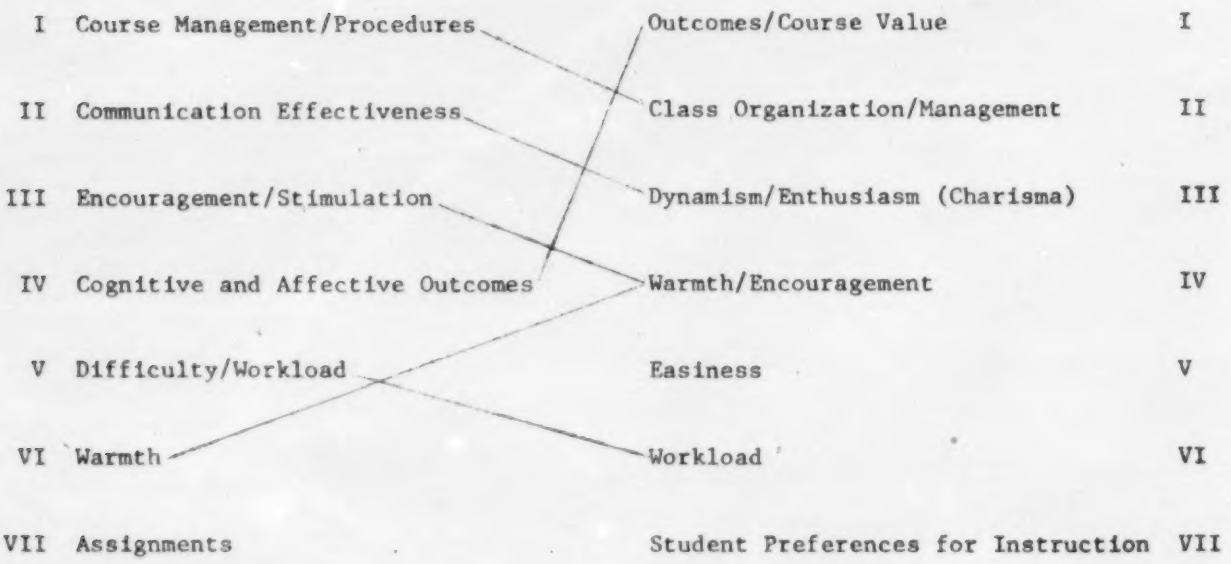
	I	II	III	IV	V	VI	VII
60. Describe your instructor's attitude toward students. A = FRIENDLY ... UNFRIENDLY = E	02	21	09	01	-04	63	-02
61. How would you characterize the instructor's ability to explain? A = VERY POOR ... EXCELLENT = E	-19	-32	03	01	04	-25	08
62. Did the instructor encourage you to develop your own ideas and approaches to problems? A = DEFINITELY YES ... DEFINITELY NO = E	08	06	58	-01	01	09	-04
63. Did you try to please the instructor based on information from other students? A = YES, DEFINITELY ... NO, NOT AT ALL = E	00	04	30	11	02	-22	-12
64. Did written assignments require a reasonable amount of time and effort? A = NO, TOO LONG ... NO, TOO SHORT = E	-04	17	27	-11	05	-17	-10
65. Did this course improve your understanding of concepts and principles in this field? A = YES, SIGNIFICANTLY...NO, NOT MUCH = E	29	01	00	66	00	05	-01
66. Was the course, as it was given, worthwhile in terms of your career objectives? A = NOT AT ALL WORTHWHILE ... VERY WORTHWHILE = E	-04	03	-08	-56	07	-08	09
67. The exams reflected important points in the reading assignments. A = STRONGLY AGREE...STRONGLY DISAGREE = E	27	-17	10	-02	03	06	35
68. The instructor corrected or rejected student statements without further discussion. A = ALMST ALWYS OCCRD...ALMST NEVR OCCRD = E	00	-09	-05	04	02	-50	12
69. I went to sleep in class. A = VERY OFTEN ... NEVER = E	-11	-14	11	-13	-07	-17	-19
70. Describe the reading assignments. A = INTERESTING, STIMULATING ... BORING, UNEXCITING = E	-03	02	07	06	-06	-12	72
71. The course was: A = ORGANIZED ... DISORGANIZED = E	48	21	-22	20	13	10	-07
72. The instructor motivated me to do my best work. A = VERY OFTEN ... SELDOM = E	32	07	37	28	14	02	05
73. The instructor emphasized important points by raising voice, repeating, etc. A = ALMOST ALWAYS ... ALMOST NEVER = E	11	54	13	01	-08	03	05

	I	II	III	IV	V	VI	VII
74. I enjoyed learning about this subject matter. A = TO A GREAT EXTENT ... NOT AT ALL = E	08	10	-01	67	-12	04	18
75. The amount of outside preparation required for this course was: A = QUITE GREAT ... QUITE SMALL = E	-10	-01	14	13	47	-05	03
76. Were you stimulated to discuss related topics with friends outside of class? A = YES, OFTEN ... NO, NEVER = E	-05	02	25	52	03	09	00
77. The instructor listened attentively to what class members had to say. A = ALWAYS ... SELDOM = E	00	-12	42	01	07	62	-08
78. How much ungraded feedback (question periods, short quizzes) should have been provided to students? A = MUCH MORE ... MUCH LESS = E	-23	10	-13	-04	11	00	11
79. Was the instructor cynical and sarcastic? A = VERY CYNICAL...NOT AT ALL CYNICAL = E	17	-17	06	-10	-03	-55	-04
80. The instructor seemed well prepared for classes. A = YES, ALWAYS ... NO, SELDOM = E	22	45	-21	10	10	22	-10
81. Did your interest in this course increase or decrease as the semester progressed? A = GREATLY INCREASED ...GREATLY DECREASED = E	34	10	09	42	00	-05	17
82. The instructor spoke in a monotone, rarely showing expression in voice. A = ALMOST ALWAYS ... ALMOST NEVER = E	09	-63	02	05	07	-14	-14
83. How often was class or group discussion monopolized by only one or a few students? A = ALMOST ALWAYS ... ALMOST NEVER = E	-07	-24	17	-12	08	-05	12
84. Was the instructor able to give references for additional reading or research? A = YES, VERY ABLE...NO, NOT ABLE = E	07	11	22	04	02	15	05
85. How difficult was the course material? A = TOO DIFFICULT ... RATHER EASY = E	-07	-02	11	-04	72	01	01
86. How much confidence did the instructor have in you as a student? A = A GREAT DEAL ... VERY LITTLE = E	12	11	31	10	-04	30	-02
87. Can you now identify main points and central issues in this field? A = YES, CLEARLY ... NOT VERY WELL = E	25	13	09	35	-10	11	-01

	I	II	III	IV	V	VI	VII
88. The instructor gave advice on how to study for the course. A = YES, OFTEN ... NO, NEVER = E	39	16	21	11	-09	-01	-06
89. Did the instructor seem to enjoy teaching? A = YES, VERY MUCH ... NO, ENJOYED IT LITTLE = E	-13	62	07	09	-05	24	05
90. Was the progression of the course logical and coherent from beginning to end? A = YES, ALWAYS ... NO, SELDOM = E	44	26	-15	21	04	06	03
91. How often did the instructor subtly decline to help student on their problems? A = VERY OFTEN ... SELDOM = E	05	-07	12	-05	05	-49	07
92. How often did you delay studying for this course? A = VERY OFTEN ... NEVER = E	-09	16	-07	-35	-16	-05	-04
93. Describe the pace of the course. A = TOO FAST ... TOO SLOW = E	17	-01	-08	01	82	-08	06
94. The instructor used humor effectively. A = YES, OFTEN ... NO, SELDOM = E	22	54	12	-13	03	05	01
95. How difficult were the examinations? A = TOO DIFFICULT ... TOO EASY = E	-17	05	-01	00	57	11	-04
96. How well did the instructor coordinate different activities of this course? A = VERY WELL ... RATHER POORLY = E	29	22	22	15	01	16	-03
97. How difficult was it to get access to the reference material for this course? A = VERY EASY ... VERY DIFFICULT = E	21	-17	13	12	-06	16	02
98. Did readings require a reasonable amount of time and effort? A = NO, UNREASONABLY DEMANDING ... NO, UNREASONABLY SIMPLE = E	-03	06	09	-12	43	-08	-05

Table 4

Comparison of First-Order Solutions



Supplement to Table 4

Comparison of First-Order Solutions

FORM A	factor loadings		FORM B	factor loadings
COURSE MANAGEMENT/PROCEDURES		II'	CLASS ORGANIZATION/MANAGEMENT	
Rate instructor's exam questions.	70		Course needed more direction.	-67
Were grading procedures fair?	64		Progression of course topics was logical.	66
Were course objectives accomplished?	56		Exams were well written.	58
Was course: organized...disorganized?	48		Too much class time was wasted.	-56
COMMUNICATION EFFECTIVENESS		III'	DYNAMISM/ENTHUSIASM (CHARISMA)	
Was instructor a good speaker?	73		Instructor has dynamic personality.	67
Was instructor a dynamic teacher?	70		Instructor was an expert in his field.	63
Did instructor speak in a monotone?	-63		Students liked the instructor.	62
Did instructor enjoy teaching?	62		Instructor was enthusiastic about subject.	60
ENCOURAGEMENT/STIMULATION		IV'	WARMTH/ENCOURAGEMENT	
Instructor encouraged new ideas.	58		Instructor praised good work.	60
Instructor raised challenging questions.	55		Instructor made helpful criticism/comments.	59
Good balance of student participation-instructor contribution achieved?	53		Instructor was sensitive to individual differences.	59
Were creative abilities enhanced?	48		Instructor encourages students for consultation.	58
COGNITIVE AND AFFECTIVE OUTCOMES		I'	OUTCOMES/COURSE VALUE	
Did course increase your interest.	68		Course encouraged me to explore subject.	72
Enjoyed learning about subject matter.	67		Course increased my interest in field.	71
Course helped fulfill personal goals.	67		Course has been a worthwhile experience.	61
Course improved understanding of concepts/principles in this field.	66		Subject matter was interesting.	59
DIFFICULTY/WORKLOAD		VI'	WORKLOAD	
How difficult was course material?	72		Workload was quite heavy.	66
How advanced was course content?	63		I couldn't keep up with other students.	61
Pace of course: too fast...too slow.	62		Assignments were unreasonably long.	59
How difficult were the examinations?	57		Course required a lot of my time.	53
WARMTH		V'	EASINESS	
How patient was the instructor?	65		Course was too easy for me.	75
Instructor attitude towards students (friendly...unfriendly)	63		Course was too elementary for me.	70
Instructor listened to students.	62		Exams were difficult.	-50
Was instructor cynical/sarcastic?	-55			
ASSIGNMENTS		VII'	STUDENT PREFERENCES FOR INSTRUCTION	
Rate the text used in course.	79		I like student-centered classes with discussion.	63
Describe reading assignments (interesting...boring)	72		I prefer less lecture and more discussion.	62
Were readings well selected?	62		I like traditional course format with lecture.	-54
			I like to do independent research.	34

Table 5

Intercorrelations Among Rotated Factors for both Forms

Form A Intercorrelations

		I	II	III	IV	V	VI
I	Cse. Mang.	-					
II	Com. Eff.	.445	-				
III	Enc./Stim.	.003	.141	-			
IV	Outcomes	.259	.509	.209	-		
V	Diff.	-.117	.168	.053	.156	-	
VI	Warmth	.471	.247	.022	.143	-.214	-
VII	Assign.	.314	.150	.216	.352	.078	.238

Form B Intercorrelations (87 items)

		I'	II'	III'	IV'	V'	VI'
I'	Out./Cse. Val.	-					
II'	Cl. Org./Mang.	.098	-				
III'	Dyn./Eath.	.361	.338	-			
IV'	Warm/Enc.	.154	.328	.325	-		
V'	Easy	-.027	-.081	-.012	-.001	-	
VI'	Work.	.107	-.482	-.214	-.226	-.187	-
VII'	St. Pref.	.088	-.281	-.110	.018	.109	.129

Table 6

Rotated Factor Loadings on First and Second Order Factors[a]

	Influence	Security	Cse.M. I	Com.E. II	St./En. III	Out. IV	Diff. V	Warm. VI	Asgn. VII
1.	46	32	31			35			
2.	45	38	33	39					
3.	47	36	34			28			
4.	22	30	26	24					
5.	-13	-28		-25					
6.	23	41	35						
7.	34	28	21	29					
8.	25	28			33				
9.	-11	-06							
10.	52	26	25			49			
11.	-19	17					-49		
12.	04	-31						-24	
13.	48	15				51			
14.	-39	-28		-24					-21
15.	38	25				44			
16.	14	02			22				
17.	-35	-34	-30						
18.	40	26	24		-24	40			
19.	15	-07					23		
20.	13	40			25			51	
21.	12	-11							
22.	-02	18	32		30				
23.	-09	10							
24.	-14	-44	-21		-26			-31	
25.	37	42	41			29			
26.	42	27		57					
27.	13	38	52						
28.	27	31		21	20				
29.	19	18			50				
30.	34	23		42					

	Influence	Security	Cse.M. I	Com.E. II	St./En. III	Out. IV	Diff. V	Warm. VI	Asgn. VII
31.	12	13			45				
32.	52	28		43					
33.	43	25				23			33
34.	19	31			42				
35.	06	34			29			35	
36.	19	-03							24
37.	31	26		25	32				
38.	04	12			37				
39.	53	23	25			49			
40.	17	-08			36				
41.	09	-23					39		
42.	20	00			39		26		
43.	36	07			46	25			
44.	23	12			27				
45.	29	41	28	20					
46.	15	10			25				
47.	21	40	35						
48.	42	19			32	31			
49.	26	22							56
50.	50	24				52			
51.	-10	-25	-22		24				
52.	30	18							71
53.	28	04			52				
54.	19	-02			31				
55.	46	32		55					
56.	07	47	47						
57.	29	-12					55		
58.	23	25	29		43				
59.	46	-14				25	41		
60.	14	46						50	
61.	-15	-36		-25				-20	
62.	21	09			55				
63.	14	-16			29				
64.	08	-15			26				
65.	46	31	22			51			
66.	-31	-15				-43			
67.	11	24	20						32
68.	01	-30						-40	

	Influence	Security	Cse. M. I	Com.E. II	St./En. III	Out. IV	Diff. V	Warm. VI	Asgn. VII
69.	-24	-23							
70.	30	12							65
71.	29	41	36		-21				
72.	46	24	24		36	21			
73.	36	28		42					
74.	51	29				52			
75.	30	-23					41		
76.	41	08			24	40			
77.	07	29			40			49	
78.	03	-13							
79.	-13	-29						-44	
80.	29	36		35	-20				
81.	46	31	25			32			
82.	-33	-26		-50					
83.	-10	-16							
84.	19	17			21				
85.	26	-29					63		
86.	22	30			29			24	
87.	33	34				27			
88.	24	32	29		20				
89.	39	28		48					
90.	34	42	33	21					
91.	02	-30							
92.	-24	-05						-39	
93.	27	-12				-27			
94.	31	29		42			54		
95.	19	-22							
96.	33	35	21		20		50		
97.	04	22							
98.	12	-22					38		

[a]All second order loadings are given but only first-order loadings greater than .20 are displayed.

Table 7

Potential Classifications of Global, General Concept and Specific Items

Items with both Second-order Loadings Greater than .30 (Global)

	55*	
2* (b = .33)	81* (b = .25)	17
3* (b = .28)	65*	96 (a = .21)
25* (b = .29)	90*	87
1* (b = .31)		

Items with a Single Significant Second-order Loading or Less

Influence > Security			Security > Influence		
First Level General Concept	Second Level General Concept	Specific	First Level General Concept	Second Level General Concept	Specific
A > a	a > A	a only	B > a	a > B	a only
39*	74*	49	56*	60*	85
10*	50*	57	24*	20*	95
32*	13*	62	6*	27	77 (+b)
59*	26*	93	45*	35	31
72*	18*	53	71*	34	79
33*	89	29	47*	68	58
48*(+b)	15	11	61	91	41
76*	43	42	80		98
14	73	40	88		38
7	30	54	12		8
	82	44	28		22 (+b)
	37				
	66	92	4		67
	94	46	86		63
	52				64
	70				5
	75				51

Unique (9, 16, 19, 21, 23, 36, 69, 78, 83, 84, 97)

Where A and B represent the loadings on second-order factors "Influence" and "Security" respectively; 'a' and 'b' represent the loadings on any first-order factors and '*' items yielded second-order loadings greater than .40.

Supplement to Table 7

Global Items

1. Rate the course content.
2. Rate the instructor.
3. Rate the course in general
81. Interest increase/decrease as course went on.
55. Was instructor a dynamic teacher?
65. Course improved understanding of concepts/principles in this field.
90. Was progression of course logical and coherent?
25. Were course objectives accomplished?
96. How well did instructor coordinate different activities of course?
87. Can you identify main points and issues in this field?

INFLUENCE DIMENSION

First Level General Concept

39. How much did you learn in this course?
10. How much do you feel you have accomplished?
32. How interesting were instructor's presentations?
59. How much effort did you put into the course?

Second Level General Concept

74. Enjoyed learning about subject matter.
50. Did course increase your interest in subject?
13. Course helped fulfill personal goals.
26. Was instructor a good speaker?

Specific

49. Were readings well selected?
57. Course content: advanced-elementary.
62. Instructor encouraged new ideas?
93. Pace of course? too fast...too slow.

SECURITY DIMENSION

First Level General Concept

56. Were grading procedures fair?
24. How did instructor respond to student difficulties with course material?
6. Did instructor have a realistic definition of excellent performance?
45. Describe the clarity of instructor's presentations of abstract ideas/ concepts.

Second Level General Concept

60. Instructor's attitude toward students (friendly...unfriendly).
20. How patient was the instructor?
27. Rate instructor's exam questions.
35. Instructor willing to spend extra time with you.

Specific

85. How difficult was course material?
95. How difficult were the examinations?
77. Instructor listened to students.
31. Instructor clarified student ideas by inflection (i.e., "Do you mean").

Figure 1

ICES Item Specificity Conceptualization

Item Category	General Appropriateness	Informational (Inference) Requirements	Primary Utility
Global	Virtually all classes	General summary (high inference)	--comparative across an institution (or most any breakdown) --not necessarily useful to instructor
General Concept	Most items apply to a majority of courses	Judgments about attributes or characteristics	--comparisons department-wide (not generally institution-wide) --general information to instructors
Specific	A set of courses constrained by setting, teaching mode, objectives emphasized etc.	More observational and perceptual rather than judgmental. (low inference)	--generally restricted to instructor use (comparative data possibly misleading)

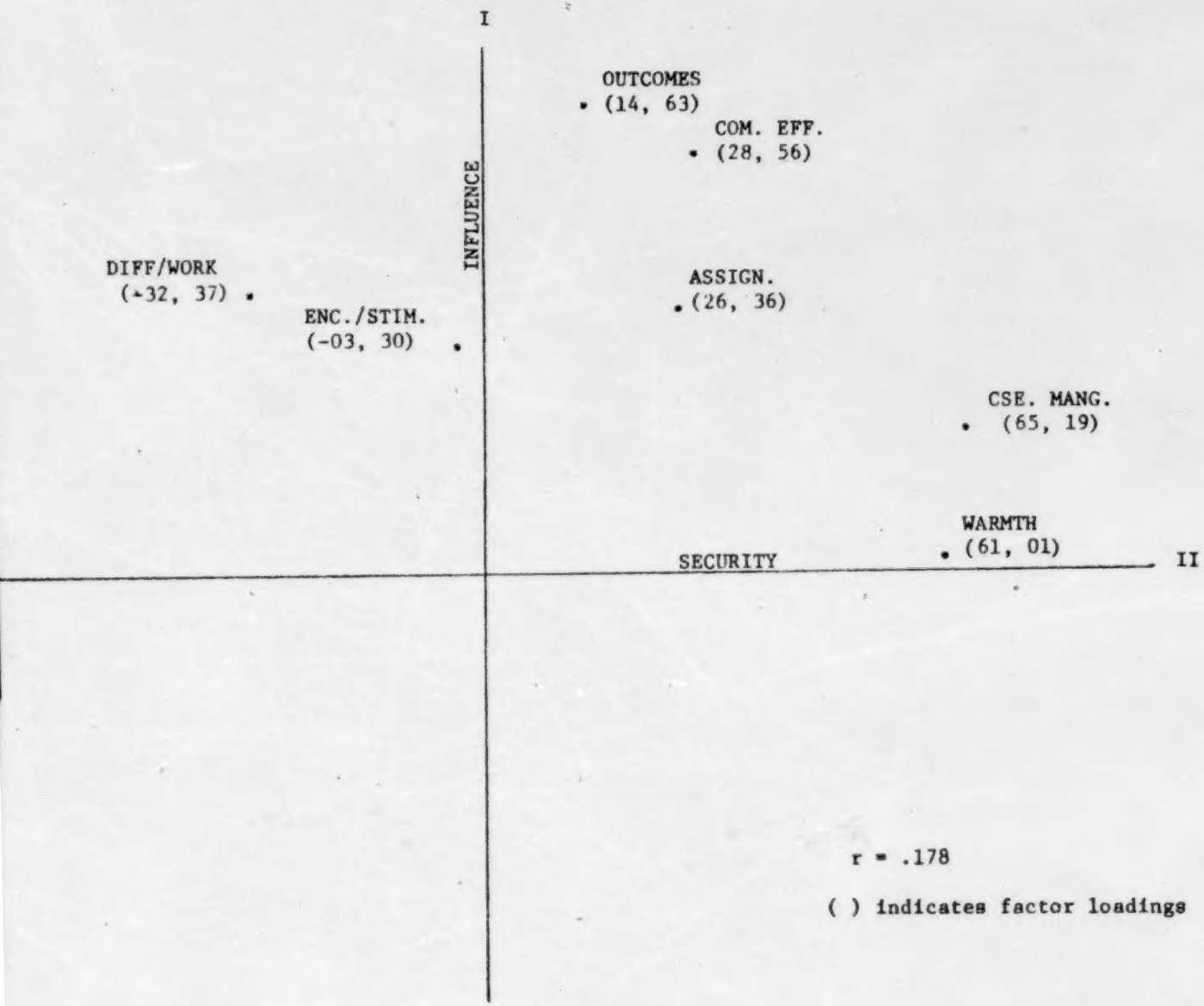


Figure 2

Hierarchical Form A Solution

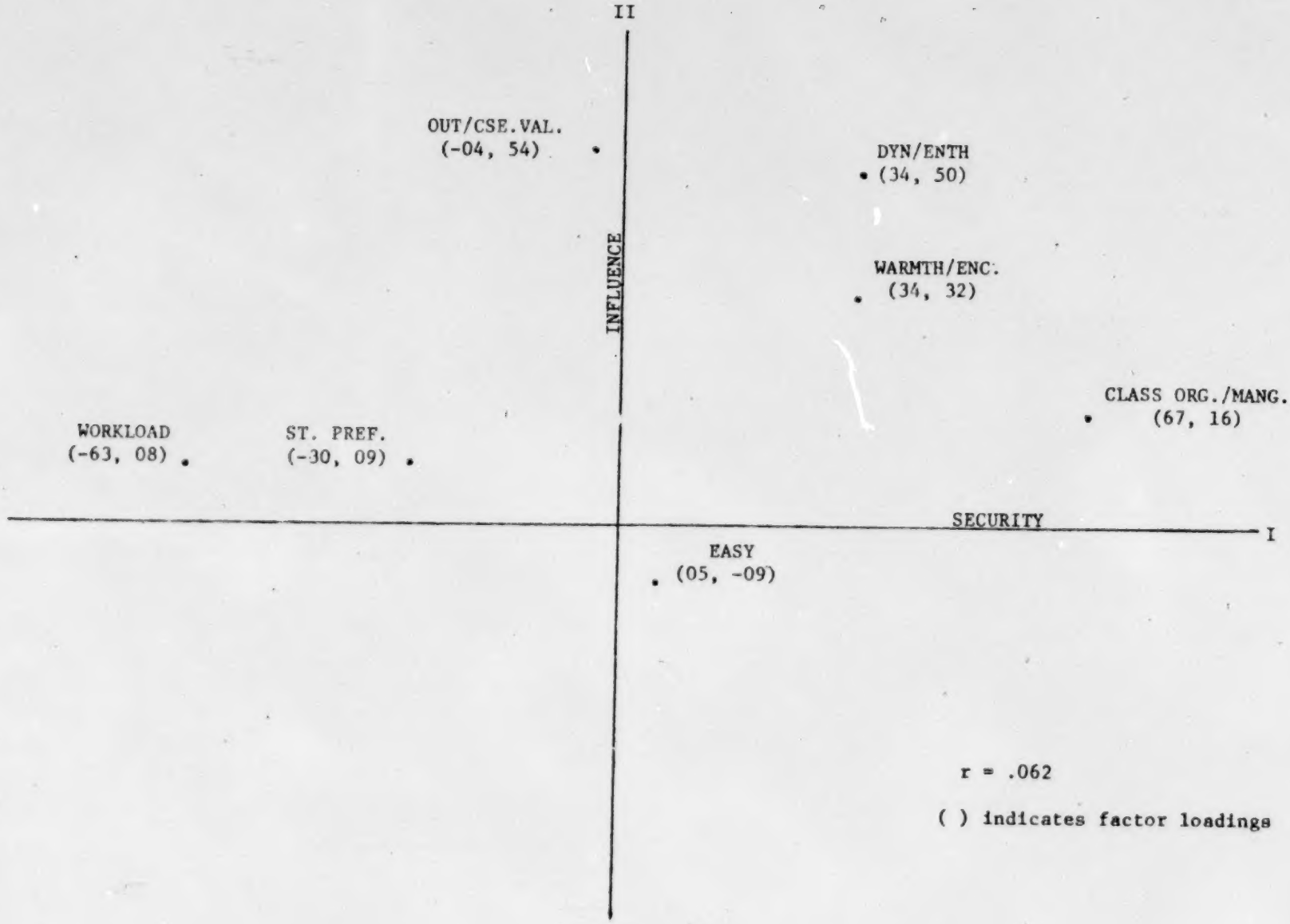


Figure 3

Hierarchical Form B (87 Item) Solution

Appendix A

Rotated Factor Loadings for Form B - 97 Item Solution

	I	II	III	IV	V	VI	VII
1. Rate the Course Content	43	03	62	-14	10	-02	-10
2. Rate the Instructor	18	2[illegible]	60	01	20	08	-15
3. Rate the Course in General	42	08	63	-07	13	07	-12
4. There was a positive interaction between students and instructor.	09	27	22	41	-01	08	-01
5. A greater variety of instructional materials should have been used.	-17	-12	-19	05	12	07	32
6. Grading was fair.	00	-03	45	25	-07	29	08
7. I looked forward to attending class.	49	11	39	06	-00	03	-06
8. This course needed more direction.	-13	-07	-66	16	03	01	06
9. This course has encouraged me to further explore this subject.	69	04	18	-03	-07	02	07
10. Assigned readings were worthwhile.	39	-34	17	17	-08	-03	-06
11. The physical environment of the classroom was pleasant.	20	01	-12	28	02	-01	-25
12. I learned a lot of facts.	27	03	50	-13	04	-03	05
13. There were too many students in this class.	08	25	-24	-09	13	16	22
14. The instructor was available for out-of-class conferences.	-11	05	11	50	-04	-01	19
15. I really admire this instructor.	17	48	35	17	07	03	-05
16. I willingly participated in class activities.	42	-00	17	23	02	-05	14
17. I was happy with the textbook.	33	-42	32	14	-08	04	-07
18. The progression of course topics was logical and coherent from beginning to end.	19	08	67	-15	-02	-00	02
19. I had the appropriate prerequisite and technical skills for this course.	14	05	11	-18	-26	26	11
20. The instructor made difficult topics understandable to students.	22	26	49	00	-08	08	07
21. Assignments were of reasonable difficulty.	15	09	03	13	-08	-14	10
22. The instructor was lenient with students.	-14	12	-05	43	-00	26	07

	I	II	III	IV	V	VI	VII
23. Class was boring.	-35	-16	-46	05	06	09	17
24. The instructor praised good work.	12	04	01	60	13	07	09
25. The written assignments bored me.	-29	04	-08	-00	33	17	-01
26. The instructor was good at answering students' questions.	11	45	14	19	-09	-06	-01
27. Classroom facilities were inadequate.	-11	10	11	-11	16	15	30
28. This course increased my interest in this field.	69	11	30	-08	-10	03	07
29. This course has been a worthwhile experience.	62	16	38	-05	-10	-07	02
30. The instructor's presentations were logical and coherent.	16	36	59	-10	06	-02	-04
31. The instructor could sense when an idea was giving students trouble.	10	25	13	35	-04	06	-02
32. The instructor should have prepared more supplementary teaching materials.	-10	-29	-20	06	18	03	24
33. I spent time on my assignments and did my best.	37	04	02	04	01	-18	21
34. The instructor used audio-visual aids to good advantage.	45	35	-16	-09	-08	-15	-11
35. The instructor encouraged students to see him/her for consultation.	-02	04	14	57	05	05	13
36. The instructor encouraged me to develop my own ideas and approaches.	31	08	-09	41	05	04	-05
37. Exams were difficult.	02	-01	-09	-12	14	-50	07
38. This instructor had no sense of humor.	05	-36	-11	-07	20	12	10
39. I prepared before coming to class.	27	-11	08	06	05	-22	04
40. This course was too easy for me.	05	-06	01	05	04	74	-01
41. This course enhanced my creative abilities.	57	16	04	16	03	-04	-02
42. The instructor was condescending.	09	-21	-00	-10	33	15	-01
43. Students seemed interested and enthusiastic about this course.	41	20	32	13	03	02	-18
44. The instructor presented material at an appropriate level for me.	30	22	28	-02	-08	-06	-07

	I	II	III	IV	V	VI	VII
45. Classes were lively.	22	28	30	23	10	05	-18
46. The instructor set unreasonable deadlines.	09	-03	00	-05	37	05	01
47. The instructor was flexible and varied course content to suit student interests.	21	16	09	38	10	17	-08
48. I mostly like student-centered classes, with lots of discussion.	08	-06	05	04	-03	-04	55
49. This instructor has a real talent for teaching.	17	54	49	06	17	06	-12
50. The instructor evaluated student work in a meaningful and conscientious manner.	08	11	26	52	06	11	06
51. Assignments and exams were graded promptly.	-10	05	16	10	-19	-02	03
52. I really like to do independent research.	34	-08	-05	08	-04	11	42
53. This course will be of value to me professionally.	57	15	04	-02	-10	-03	10
54. The instructor's presentations were effective.	35	43	39	-08	-04	03	-12
55. I really like self-paced courses, with flexible scheduling.	-00	-01	-03	09	09	04	24
56. Too much class time was wasted.	01	-16	-56	15	13	29	04
57. The instructor set high standards for evaluating student performance.	26	01	-03	-10	19	-30	11
58. There was a lot of class discussion.	06	-07	-03	55	18	07	-12
59. I couldn't keep up with the other students.	-18	-07	10	18	58	-15	-06
60. The instructor was very patient with students.	00	28	-11	51	-19	04	01
61. The instructor carried us far beyond the textbook.	20	36	05	07	10	-02	-00
62. Exams were reviewed in class.	07	-01	-20	37	-02	02	-08
63. The instructor was friendly.	-01	48	-08	38	-23	-02	04
64. The instructor frequently reviewed important points.	18	28	25	25	-08	02	01
65. The subject matter was interesting.	61	13	30	-09	-15	-01	01
66. Exam questions were overly tricky.	08	-00	-36	-10	17	-26	-06

		I	II	III	IV	V	VI	VII
67.	The instructor was receptive to differing viewpoints and opinions.	12	12	-14	54	-05	09	-04
68.	Exams were well written.	03	-03	52	19	01	23	10
69.	Assignments were wort while.	50	-04	09	15	-18	08	04
70.	I would like to do independent research with this instructor.	35	34	07	20	01	14	13
71.	If I had needed help, I would have asked for it.	17	15	02	20	-27	00	21
72.	Students in this class were friendly.	18	-04	03	12	-12	01	00
73.	This course required a lot of my time.	20	05	09	04	54	-39	11
74.	I would have preferred less lecture and more discussion.	01	-01	-07	-03	09	-05	55
75.	The instructor spoke clearly and audibly.	03	40	23	06	-06	-01	03
76.	This course increased my self-confidence.	53	14	19	10	03	19	01
77.	Interacting with this instructor destroyed my confidence in my abilities.	-13	-21	-03	-11	47	03	-01
78.	My grade will accurately reflect my accomplishments in this course.	13	06	27	15	-08	27	07
79.	Readings were quite difficult.	-20	12	03	11	43	-15	10
80.	The students liked the instructor.	01	53	31	25	00	09	-13
81.	The instructor seemed to enjoy interacting with students.	10	45	00	47	-11	-01	02
82.	The course was too elementary for me.	01	-08	-09	03	06	70	03
83.	The instructor accepted no excuses for late or incomplete work.	14	-03	13	-35	16	07	-07
84.	The instructor made helpful criticism and comments about your work.	11	-01	05	58	07	01	01
85.	This instructor has a dynamic personality in the classroom.	07	57	29	17	11	02	-14
86.	The instructor made the material more interesting.	22	50	41	07	09	03	-17
87.	Assigned readings were thought-provoking.	32	-17	28	18	10	-02	-02
88.	This course has been worthwhile.	59	17	37	-02	-09	-04	-06
89.	I mostly like a traditional course format, with lectures.	06	05	06	05	16	10	-44

	I	II	III	IV	V	VI	VII
90. The workload was quite heavy.	12	05	06	04	65	-22	08
91. Too much busy-work was required.	-02	15	-16	-03	51	14	-02
92. The instructor was enthusiastic about his subject.	21	52	04	11	-05	-17	-13
93. The instructor was really an expert in his field.	13	57	19	03	07	-14	-09
94. The instructor was sensitive to students' individual differences.	10	19	02	63	08	11	-02
95. I would recommend this course to other students with interests similar to mine.	58	19	38	-01	-07	03	-04
96. Assignments were unreasonably long.	-07	06	-01	01	58	-01	-00
97. The instructor seemed well-organized as a teacher.	11	44	54	-08	04	-03	-09

Appendix B

Eigenvalues and Percent of Variance for Form B - 87 Items

	Factor Labels	Eigenvalue	Percent of Common Variance
I'	Outcome/Course Value	19.80	56.57
II'	Class Organization/Management	4.37	12.49
III'	Dynamism/Enthusiasm (Charisma)	3.64	10.40
IV'	Warmth/Encouragement	2.47	7.06
V'	Easiness	1.77	5.06
VI'	Workload	1.69	4.71
VII'	Student Preferences for Instruction	1.30	3.71
	TOTAL	35.00	100.00